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musculature. The author also fails to cite certain important memoirs, such as Gaubert on the lyriform organs, Wagner on the auditory hairs and moult, Lamy on the respiratory organs, and Menge on copulation and sperm transfer. The treatment of the habits (46 pp.) is excellent on the whole, for here Mr. Warburton is much more in his element, though few literature references are given; there is considered the moulting, behavior of the newly-hatched, architecture (especially good on the orbicular nares), poison, fertility, natural enemies, protective coloration and mimicry (at places these two are confused, and also the latter with aggressive coloration), the senses, intelligence and mating habits. With regard to hearing he concludes: "If there be any true hearing organ in spiders its location is quite uncertain"; it is strange he does not even refer to the work of Wagner, Dahl and Pritchett. Chapter XV., 38 pp., is the taxonomic treatment of all the araneid families, with notes on habits and distribution, the classification adopted being that of Simon; only a few of the families are illustrated by figures.

The chapter on the Tardigrada, 11 pages, by Shipley is excellent. He concludes "there can be no doubt that the Tardigrades show more marked affinities to the arthropods than to any other group of the animal kingdom," which is well in accord with our present knowledge. Shipley also contributes a brief but good chapter on the Pentastomida.

In 42 pages the Pycnogonida are well considered by D'Arcy Thompson, with a good account of the structure. There is an excellent figure of the male of *Boreonymphon* carrying the young. All the families are described. As to the genetic affinities he believes "that such resemblances as the Pycnogons seem to show are not with the lower arachnids but with the higher; they are either degenerates from very advanced and specialized Arachnida, or they are lower than the lowest. Confronted with such an issue, we can not but conclude to let the Pycnogons stand apart, an independent group of Arthropods."

We can say of this volume that what is

given is given fairly well, the errors are mostly of omission. The most serious omission is the lack of description of the embryology, for in certain of the groups no mention at all is made of the development, and in others nothing except a few larval stages are described. The reader might be led to believe that many of these animals do not have ontogenies! It may be fairly asked, how can any one form a good concept of an animal's structure without a knowledge of its development? At least short résumés of the ontogenies should have been presented. It also occurs to the reviewer that it would have been much better to have devoted two volumes to the groups treated in this one, just as two volumes have been given to the insects. Had this been done, the treatment of each group could have been much more comprehensive, the errors of omission avoided, and the work thus made much more valuable for reference.

Great praise is certainly due to the chapters on the Arachnids, for they help to fill a long-felt want; this group has always received scanty treatment in text-books, and the larger works are not accessible to most students. From most text-book accounts one would gather that the Arachnids are mostly scorpions! It is to be hoped that this last volume of the Cambridge Natural History will arouse wide interest in the group of the spiders, so interesting in structural specialization and instincts, and will lead, in our teaching, to the supplanting of the alcoholic scorpion by the living spider. And it is also hoped it will stimulate more students to investigate those neglected aberrant groups, the tardigrades, pentastomids and mites.

THOS H. MONTGOMERY, JR.

SCIENTIFIC JOURNALS AND ARTICLES

Internationale Revue der gesamten Hydrobiologie und Hydrographie. Unter Mitwirkung von ALBERT, FURST VON MONACO, ALEXANDER AGASSIZ, CARL CHUN, F. A. FOREL, VIKTOR HENSEN, RICHARD HERTWIG, SIR JOHN MURRAY, FRITJOF NANSEN, OTTO PETTERSSON und AUG. WEISMANN. Herausgegeben von BJORN HELLAND-HANSEN

(Bergen), GEORGE KARSTEN (Halle), ALBRECHT PENCK (Berlin), CARL WESENBERG-LUND (Hilleröd), RICHARD WOLTERECK (Leipzig) und FRIEDRICH ZSCHOKKE (Basel). Redigiert von R. Woltereck. Bd. I., XXII., 900, 76 pp., 21 Taf. Leipzig, Verlag Dr. W. Klinkhardt; New York, G. E. Stechert. 1909. M. 30.

The past ten years have witnessed the origin of more than a score of new journals or serials of a periodical nature, primarily with zoological contents or including zoology as one of their main fields. Some of these are the organs of institutions of research or of societies of investigators, new and old. Others owe their origin to single investigators or their schools, and still others are the logical outcome of the increasing tendency to specialization and represent particular fields of research. The journal in hand, which is now in its second volume, owes its origin in part to the last-named cause, but even more to a movement in the opposite direction of generalization based upon the cooperation of investigators and coordination of results in the different sciences concerned in the causal analysis of the problems of the biology of fresh waters and of the sea. Investigators in these fields of marine and fresh-water biology in which the sciences of botany, zoology, bacteriology, chemistry, physics, hydrography and physical geography are all intimately concerned, have long felt the need of a common journal or clearing house where all results bearing on the biological aspects of these problems may be published and where comprehensive reviews written from the standpoint of hydrobiology and an up-to-date bibliography might be found with more convenience, completeness and certainty than in scattered journals in these diverse sciences. The *Revue* bids fair to meet this need and to afford a most acceptable and efficient organ for the coordination of these several sciences by keeping each separate branch of study in constant touch with the advances made in all other departments, and to render effective service in extending and stimulating work in its field.

The international character of the journal is sufficiently indicated by the list of coadjutors, editors and contributors and the comprehensiveness of its scope is attested by its program, which appears in full in the "Prospekt," issued in 1908, which forms the introduction to the volume.

Above all, the editors recognize the necessity of a synthesis of our biological and hydrographic-geological knowledge of the waters. These two spheres of investigation are inseparable; since the water, whether as river, lake or sea, is never a factor in the shaping of the earth without being also a medium of life, and on the other hand, is never a medium for life without at the same time having an important influence in the shaping of the earth's surface.

As the biology of the waters has now passed from the description of what is found therein into the causes and origins of the animal and plant life and the phenomena accompanying it, the absolute necessity has arisen for the biologist to really understand the nature of the separate waters, their physics and chemistry as well as their form and the history of their bed.

On the other hand, with the advance of marine and fresh-water investigations (in brief, the study of the waters), it has also become necessary for the hydrographer and geologist to understand something of the biological factors, which are operative in the physico-chemical changes of the water as also in the formation of coasts, land and deposits.

The editors justify the inclusion of both fresh-water and marine fields in the same serial on the ground that a synthesis of results in the two is desirable because of their common, overlapping, or interdependent problems. They also express the hope "to bring into existence a helpful synthesis of the results obtained by the pure sciences and the practical or applied sciences."

Of the nearly 1,100 pages in the volume, 523 are given to original articles, usually upon topics of more general interest, 180 to summaries and critical reports, 80 to bibliographies and the remainder to short notices on scientific matters, on biological stations, expeditions, surveys and university courses in the field of the journal.

As might be expected from the composition of the board of editors the contents of the *Revue* are primarily zoological, only a single purely botanical title appearing in the list of original articles and but five in the field of hydrography. Noteworthy among these is a prodromus for a renewed attack with the "Fram" upon the problem of the North Polar Basin by Raoult Amundsen. There is also a predominance of fresh-water subjects (16) over those (5) from marine fields which is in part due to the editor's relationship to the new fresh-water station at Lunz in the Austrian Alps, and to the further fact that many investigators in the marine field are connected with the various branches of the International Commission for the Investigation of the Sea or other governmental or institutional enterprise of a similar sort having their own mediums for publication. Among the original articles of a general character are a Hydrobiological introduction by Professor Weismann in the closing words of which he reaffirms his adherence to the Darwinian point of view as to the efficacy of minute variations as over against mutations in the process of evolution. A second introductory article by Dr. John Murray on "The Distribution of Organisms in the Hydrosphere as affected by Varying Chemical and Physical Conditions" is a statement of problems and results in marine biology in the light of recent investigations in oceanography and limnology. Professor Richard Hertwig discusses the function of the fresh-water biological station in present-day research and Professor Issel contributes a general article on the biology of hot springs. Two pages of unusual general interest are those of Lohmann on the relation between pelagic deposits and the plankton of the sea and of Nathansohn and Gran on the general conditions of production in the sea.

Intensive work, on the other hand, is represented by Dr. Gotzinger's carefully wrought out limnological monograph on the Lunzer Mittersee, by Klausener's studies on the "blood lakes" of the high Alps, by Kratzschmar's experimental analysis of the polymorphism of *Anuraea aculeata* and by Pro-

fessor Fischel's elaborate studies of the intra-vitam staining of *Daphnia* in which the success of the new intra-vitam stain alazarin is shown. The "Sammelberichte" constitute one of the most useful parts of the journal. They deal with a wide range of subjects, from Brehm's article on the geographical distribution of copepods and their relation to the ice age to Steche's compressed summary of our present-day knowledge of *Hydra* and Franz's review of the latest results in the study of the migrations of fishes in the North and Baltic seas, and his discussion of the economic significance of recent discoveries in the life history of the eel. Of especial service are the authentic summaries of the work of various surveys and explorations, such as Collet's and Scourfield's accounts of the hydrographical, geological and biological results of the all too little known work of the Scottish Lake Survey, Cori's description of the work of the Adria Verein at Trieste, Entz's summary of the Balaton Lake investigations in Hungary, Juday's résumé of the exploration of the Wisconsin Natural History Survey, Zschokke's note on the results of the investigations of high alpine waters and Zuelzer's review of the recent work in Germany upon the biology of polluted waters, a subject deserving wider attention in our own country.

Notices (often illustrated) of the biological stations at Port Erin, Roscoff, San Diego, Monaco, Lunz, Plön, Sebastopol, of instruction in oceanography and related subjects in universities, of congresses, expeditions, etc., find a fitting place in the several "Hefte" of the *Revue*.

The original prospectus included a project for a continuous index of papers received and annual summaries of the year's production in the whole "science of waters." The first part of this program was wisely dropped with the issue of the first Heft, and the second obviously could hardly be completed in 1908. The difficulties which beset even the best organized and longest established "Jahresberichte" in the more centralized fields of research can only be adequately appreciated by those who perform the thankless drudgery of their preparation. In the diffuse field of hydro-

biology how much more difficult the organization and prompt completion of annual summaries requiring, as these do, the cooperation of specialists in less closely associated subjects! Nevertheless Professor Woltereck and his associates have undertaken the seeming impossible and Bd. I. contains as a supplement the first section of the Jahresübersicht for 1908 including: I., Limnography; II., oceanography; III., fresh-water botany; IV., marine botany; V., applied hydrobiology (polluted waters and water supplies); VI., fresh-water zoology (excluding vertebrata). The remaining parts (with Nachträge to those above named) will be issued in the current year. These are VII., marine zoology (excluding vertebrata); VIII., marine and fresh-water fisheries with supplement on "Aquariumkunde"; IX., potamology, moorkunde, thermal and cave waters.

Obviously a considerable part of this field (III., IV., VI. and VII.) is already covered in the long-established botanical and zoological summaries and bibliographies, but all too often imperfectly and not from the standpoint of hydrobiology. The other fields are sorely in need of just such summaries and bibliography as are here projected. Every worker in these fields should help on the project of securing complete and prompt representation of the literature by providing the *Revue* with reprints or notices of his work. Naturally there are many deficiencies in the parts now published, but they are to be expected in the initial stages of all such enterprises. The bibliography and summaries of literature form a supplement with independent pagination.

The new *Revue* should receive the cordial support and cooperation of all who are interested in the manifold phases of hydrobiology, whether descriptive, experimental or applied.

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THE TREATMENT OF CERTAIN TICK-
TRANSMITTED DISEASES.

EVER since the discovery of the destructive effect of quinine on the causative organisms of

malaria, investigators have dreamed of the possibility of discovering similar therapeutic agents for use in other diseases caused by blood-infesting organisms. A recent paper by Messrs. Nuttall and Hadwen,¹ dealing with experiments conducted at the University of Cambridge, seems to indicate that drugs have been discovered which display the same destructive effect upon certain species of disease-causing species of *Piroplasma* as quinine has upon the organism of malaria.

There are four distinct diseases of domestic animals caused by as many species of *Piroplasma*.² Of these, splenetic or Texas fever occurs in various of the warmer parts of the earth and causes tremendous economic losses. Malignant jaundice of the dog occurs in India and South Africa and displays a very high lethality. Biliary fever of horses occurs in Africa, the loss is considerable. Carceag of sheep occurs in southern Europe and is considered an important disease. In all these diseases certain ticks have been found to be the agents of transmission.

In the experiments of Messrs. Nuttall and Hadwen the most remarkable results were obtained from the use of the stains known as trypanrot and trypanblau, in aqueous solutions injected subcutaneously. These were found to exert a direct and observable effect upon the

¹ Nuttall, J. H. F., and Hadwen, S., "The Successful Drug Treatment of Canine Piroplasmosis together with Observations upon the Effects of Drugs on *Piroplasma canis*," *Parasitology*, II., Nos. 1-2 (double number), pp. 156-191, July, 1909.

² In the literature the organism of the so-called Rhodesian fever of cattle is referred to as *Piroplasma parva*. However, Mr. Nuttall has pointed out that this species is not congeneric with those causing splenetic or Texas fever of cattle, malignant jaundice of dogs, biliary fever of horses and carceag of sheep. He has therefore erected the genus *Theileria* for the organism referred to as *Piroplasma parva*. This is especially interesting in view of the fact that the drugs which were found to have a most decided effect upon the true *Piroplasma* species did not exert any effect whatever on the parasite of Rhodesian fever.